AVIATION

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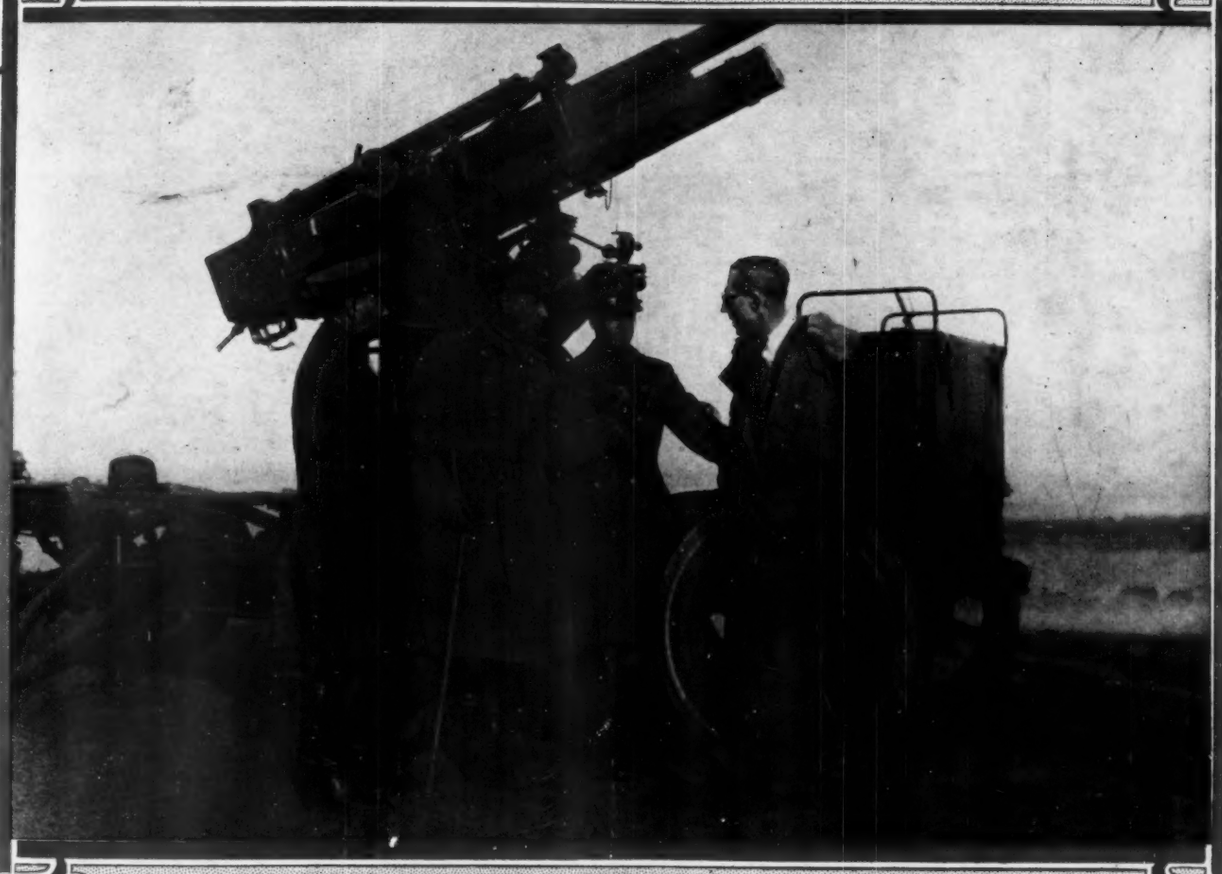

General Mitchell discussing the anti-aircraft results

VOLUME XVIII

NUMBER 15

SPECIAL FEATURES

THE ADVENT OF THE BIG AIRLINER

NEW TRAVEL AIR COMMERCIAL PLANE

STABILITY AND CONTROLLABILITY OF AIRPLANES

GARDNER PUBLISHING CO., INC.
HIGHLAND, N. Y.
225 FOURTH AVENUE, NEW YORK

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APRIL 13, 1925

AVIATION

VOL. XVIII. NO. 15

Published every Monday

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VOL. XVIII APRIL 13, 1925 No. 15

Races or Contests

IN the early days of the airplane the public was keenly interested in watching any kind of flying. Race meets attracted great crowds and the enthusiasm was tempered only by the ever present anticipation of accidents. Gradually this interest has waned; people no longer look up at aircraft as something unusual, they take aviation as a matter of course and this lack of attention is a very hopeful sign. It accepts air navigation as a regular part of the day's routine. To attract the crowd now, there must be some truly exceptional event. At St. Louis there was probably the greatest number of persons ever gathered together at an air meet. At Dayton, in spite of the great preparations and advertising the crowd was a disappointment. The reasons for these conditions are worth considering, for they have a very direct bearing on the Pulitzer Race this year.

The airplane has natural limitations as a racing contestant. To those unfamiliar with aircraft, all types regardless of size, appear very similar in the air. The distance from the spectators at which air races have their start and at which they are flown militates against that close interest that is found in races where the public can get a close view of what is going on. Contests for efficiency usually require technical decisions that have no interest for any one but the aeronautically informed. This also applies to load contests. In fact, speed may be said to be the only feature of air contests that interests the public, unless stunting or the element of accident is included.

Except where the very fastest airplanes are flown, there is not much perceptible difference between the speed of aircraft. The speeds of two competing planes are very seldom so nearly alike that they really appear to race. Most airplane races are processions and the score board becomes the center of interest. When racing types are flown, the interest has seemed to center on the possible records. And this brings us to the present situation.

The Pulitzer Trophy is intended to be the speed classic of the aeronautical world. While the record for speed has gone abroad temporarily, it should not be overlooked that the speed race record is still with us. In fact the low landing speed required in the Pulitzer Race seems to be an obstacle that foreign constructors cannot combine with the high speed. This year both the Army and the Navy have ordered racing planes to enter the Pulitzer Race. The possibility of foreign entries coming to the race seems to be slight, not only because of the low landing speed requirements, but due to the conflict of the date of the Beaumont Cup Race. This brings up the point of contests. Could there not be held in connection with the races speed trials which would not be limited by racing rules? These have been held in the past, after the crowd has left. These would probably attract greater crowds than the race itself. It would in reality be a real race for speed against the world.

The British Navy Takes Second Place

THE British Air Force has taken the traditional place of the Navy as the first line of home defense, war experts told the House of Commons during the debates on the naval estimates. The discussion resembled much of the testimony given before Congressional committees, recently. The British Government was urged to impress on the British people that the defense of the British Isles rested with the air force.

"Today the navy could hold supreme command of the sea and yet could be destroyed without being able to fire a shot to prevent it" Parliament was told. "Within a few hours after a declaration of war, a fleet of airplanes could appear over London, drop high explosives and incendiary bombs and do ten times more damage than was done by the Germans in the war, and every one of our great cities would be liable to a similar visit. The time is inevitably coming when airplanes will be able to dominate operations by sea—at any rate, narrow seas—and make it impossible for certain ships to exist within their radius of action." To make the "demotion" more definite it was accepted that the Air Force should be recognized as the first line of home defense and the navy described hereafter as being useful, merely as a protection for the limbs of the Empire.

Of course conditions differ in the plans for the protection of every country and the problems confronting Great Britain are different from those that would be met with in formulating defensive plans for the United States and its dependencies. The significant fact for Americans is, that in any future Conference for the limitations of armaments the changed condition of the naval prestige should be recognized. Parity is no longer a thing of prime consideration. The essential things to be taken into consideration are the necessities of the dominions of any country and the character of the surrounding sea areas. Against countries without air forces, navies will continue to play the same role that they have in the past but against major air powers their utility and mission are undergoing a great change.

We have heard for many years the opinions of so called "naval experts." These have usually been close students of naval progress who have undertaken the spreading of propoganda regarding naval matters. While advice on air policy and equipment will be more and more necessary in determining the defense policy of any country, it is to be hoped that this will come from those charged with the formulation of broad policies and not specialists.

The recent campaign of naval writers and speakers which seems to have as its objective a belittling of aircraft and a greater glorification of the battleship is not so pronounced in Great Britain as it is in this country. Here there are no champions of the air in official circles who can state their case with the same authority as the heads of Departments. It is one of the first needs of our aviation—an outspoken champion in the Executive.

New Travel Air Commercial Plane

Three Seater Biplane with OX5 Motor Shows Fine Performance and Load Carrying Ability

The first machine produced by The Travel Air Manufacturing Co. of Wichita, Kan., has recently been tested with very good results. The certified figures appeared in the March 30, 1925 AVIATION. This design is by Lloyd Stearman, already well known for his commercial designs. It is a single bay, tractor biplane powered with a Curtiss OX5 engine. Accommodation for pilot and two passengers is provided in two cockpits. The entrance to the passengers' cockpit is through a door on the port side. In order to reduce noise and prevent the exhaust gases from annoying the passengers, the exhaust manifolds are carried under the leading edge of the lower wing.

The wings are of conventional design, built entirely of select spruce, having laminated spruce spars. Both laminations are routed inside between bolt holes, forming a very strong box spar. The ribs are of spruce lightened between spars and with 3/16 in. grooved cap strips. The compression webs are solid and reinforced with spruce strips on both sides. Trailing edge is ¼ in. steel tubing. The internal bracing is of No. 9 steel wire. The floor on the lower wing is of 3/16 in. plywood, extending from the entering edge to trailing edge on both wings and is 16 in. wide. All fittings are of ample size, correctly designed. There are no bolts running vertically through the spars.

Controls

The ailerons are on the top wing only and are balanced, making the plane extremely easy and sensitive on the lateral control. They are operated by a push-and-pull tube of duralumin through the lower wing from control stick to a bell crank and a streamline steel tube from the bell crank to the aileron. Each aileron operates independently of the other. The ship can be flown with only one aileron and without the elevators, using the stabilizer adjustment for longitudinal control. There are no pulleys in the entire control system. All wing and center section struts are N type of stream line steel tubing.

The fuselage is fabric covered and built entirely of welded seamless steel tubing braced with tubing from the passenger's seat forward and with No. 10 steel wire from pilot's seat to sternpost. The top longeron is not cut away for the door, as the door is in the cowling only, with a step of only 19 in. from the lower wing to the top longeron at the passenger's cockpit. Fairing is of light spruce strips, the turtle back being carried through to the sternpost. The engine mounting is built of steel and is integral with the fuselage, having rubber above and below the square steel engine bearers at engine supports. The radiator is mounted below and at the rear of the engine. Both pilot and passenger's seats are comfortably upholstered and are of ample width. The seats in both cockpits have spring cushions. The landing gear is built entirely of steel with the exception of the duralumin spreader bar. The vees are of stream-line tubing. The tail skid is an all steel leaf spring and will require no attention. The gasoline tank is in the fuselage behind the engine and holds thirty-five gallons. There is a large strainer and water sump at the carbureter, with a reserve of four and a half gallons.

Empennage

The tail surfaces are of steel with exception of the stabilizer which has a steel tube entering edge with spruce ribs and rear spar. There are two separate elevator control masts, both being completely housed in the fuselage and fin to reduce parasite resistance. The stabilizer is adjustable from the pilot's cockpit. The fin is adjustable on the ground to take care of engine torque.

SPECIFICATIONS

Height, overall	8 ft. 6 in.
Length, overall	23. ft. 6 in.
Span, upper wing	33 ft.
Span, lower wing	29 ft.
Chord, upper wing	5 ft. 6 in.
Chord, lower wing	4 ft. 8 in.
Total wing area including ailerons	296 sq. ft.
Weight empty, with water	1300 lb.
Useful load	750 lb.
Total weight	2050 lb.
Wing loading	6.93 lb./sq. ft.
Power loading	22.77 lb./hp.
Maximum speed	96.5 mi./hr.
Landing speed, full load	38 mi./hr.
Fuel capacity	35 gal.
Factor of safety	8 plus.

One-half front view of the new Travel Air commercial plane showing the neat nose fairing and radiator position

New Foote Gears Distributor

Foote Bros. Gear & Machine Co., whose newest gears are advertised in AVIATION, has recently completed arrangements with Gibbens & Gordon, 532-534 Canal Street, New Orleans, for the distribution of Foote IXL Speed Reducers and Gear Products for the territory surrounding New Orleans.

Bureau of Mines Takes Over Helium

A bill passed by Congress during the last days of the session makes important changes in the control of helium. This bill provides principally for three things: (1) the conservation of helium by securing reserves; (2) embargo on export; (3) the production of helium, which is placed in charge of the Bureau of Mines on or before June 30, 1925.

The Bureau of Mines states that the production policy will be maintained in the future about the same as in the past. The present gas supply from the Petrolia field is so limited that it does not even supply all the needs of the Army and Navy. It will have to be supplemented in the near future by connecting another helium-bearing gas field to the present line. Such a field is known, with gas of satisfactory grade and high quantity, which can be connected by building about 32 mi. of branch pipe line. No appropriation has yet been made by Congress, and if this is undertaken before Congress makes such appropriation it would have to be done by saving about half the appropriation for production in the coming fiscal year. This could probably not be done without curtailing production during part of the year.

It is expected that a conservation fund of about $3,000,000 will be appropriated soon after Congress convenes. This would be used in acquiring as many helium reserves as possible, with the purpose of leaving the helium in the ground for long time storage until needed. The current needs of helium would be taken care of in the immediate future as at present, by putting a plant or plants on natural gas lines where the gas is being used for industrial purposes, and the helium would be lost if not recovered, while the gas is being drawn on. The Bureau of Mines expects to confine the acquisition of reserves to gas of rather lean b.t.u. value. It cannot afford to purchase entire fields containing gases of good thermal value, and if this were possible, there would always be the pressure of communities needing the gas to have the fields opened up and drawn upon before they were needed for helium content.

The conservation policy it will be seen has two different angles; the production of helium as a by-product from gases being used industrially, and securing reserves of gases with good helium content, but of little thermal value, for long storage. The important parts of the Bill (Public—No. 544—68th Congress, H.R. 5722) follow:

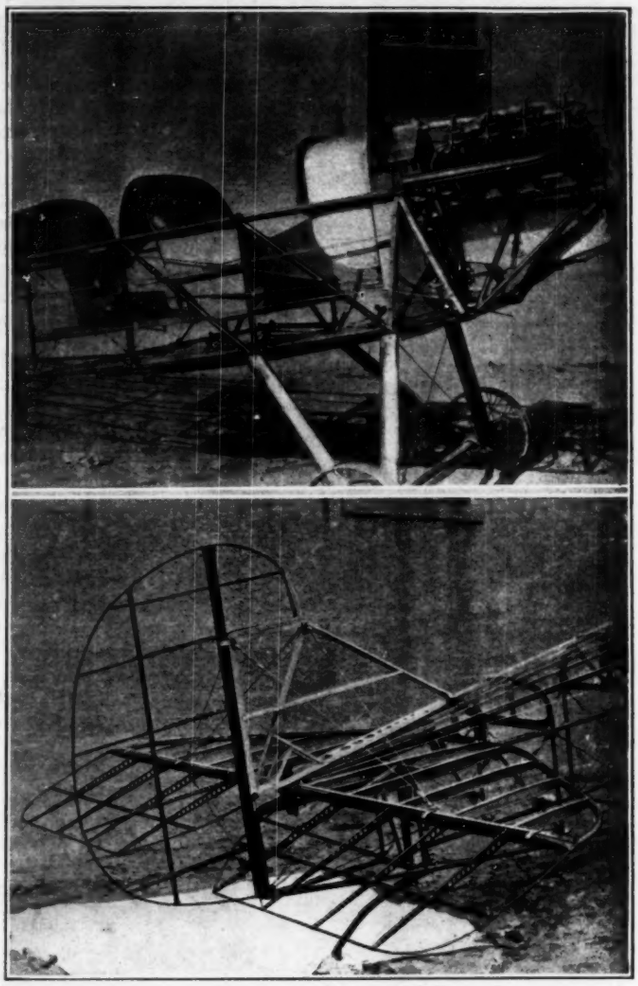
For the purpose of producing helium with which to supply the needs of the Army and Navy and other branches of the Federal Government, the Secretary of the Interior is hereby authorized to acquire land or interest in land by purchase, lease, or condemnation, where necessary, when helium can not be purchased from private parties at less cost, to explore for, procure, or conserve helium-bearing gas; to drill or otherwise test such lands; and to construct plants, pipe lines, facilities, and accessories for the production, storage, and repurification of helium: *Provided*, That any known helium gas-bearing lands on the public domain not covered at the time by leases or permits under the Act of Feb. 25, 1920, entitled "An Act to promote the mining of coal, phosphate, oil, oil shale, gas, and sodium on the public domain," may be reserved for the purposes of this Act, and that the United States reserves the ownership and the right to extract, under such rules and regulations as shall be prescribed by the Secretary of the Interior, helium from all gas produced from lands so permitted, leased, or otherwise granted for development.

The Bureau of Mines, acting under the direction of the Secretary of the Interior, is authorized to maintain and operate helium production and repurification plants, together with facilities and accessories thereto; to store and care for helium; to conduct exploration for and production of helium on and from the lands acquired or set aside under this Act; to conduct experimentation and research for the purpose of discovering helium supplies and improving processes and methods of helium production, repurification, storage, and utilization.

That on or before June 30, 1925, all existing Government plants operated by the Government or under lease or contract with it, for the production of helium shall be transferred to the jurisdiction of the Bureau of Mines: *Provided*, That thereafter the Army, and Navy and other branches of the Federal service requiring helium may requisition it from the said bureau and make payment therefor by transfer of funds on the books of the Treasury from any applicable appropriation at actual cost of said helium to the United States, including all expenses connected therewith: *Provided further*, That any surplus helium produced may, until needed for Government use, be leased to American citizens or American corporations under regulations approved by the President: *And provided further*, That all moneys received from the sale or leasing of helium shall be credited to a helium production account and shall be and remain available for the purposes of this section; and that any gas belonging to the United States after the extraction of helium, or other by-product not needed for Government use shall be sold and the proceeds of such sales shall be deposited in the Treasury to the credit of miscellaneous receipts.

Hereafter no helium gas shall be exported from the United States, or from its possessions, until after application for such exportation has been made to the Secretary of the Interior and permission for said exportation has been obtained from the President of the United States, on the joint recommendation of the Secretary of War, the Secretary of the Navy, and the Secretary of the Interior. That any person violating any of the provisions of this section shall be guilty of a misdemeanor and shall be punished by a fine of not more than $5,000 or by imprisonment of not more than one year, or by both such fine and imprisonment, and the Federal courts of the United States are hereby granted jurisdiction to try and determine all questions arising under this section.

The Army and Navy may each designate an officer to cooperate with the Department of the Interior in carrying out the purposes of this Act, and shall have complete right of access to plants, data, and accounts.



Above: The fuselage before covering, showing welded tube construction and engine mounting

Below: The empennage, showing detailed construction and location of elevator horns

Accelerations in Flight

N.A.C.A. Report No. 203

This paper, published by the National Advisory Committee for Aeronautics, was presented to the Massachusetts Institute of Technology in partial fulfillment of the requirement for the degree of master of science by J. H. Doolittle. This work on accelerometry was done at McCook Field for the purpose of continuing the work done by other investigators and obtaining the accelerations which occur when a modern high-speed pursuit airplane is subjected to the more common maneuvers.

The accelerations obtained in suddenly pulling out of a dive with well-balanced elevators are shown to be within 3 or 4 per cent of the theoretically possible accelerations. The maximum acceleration which a pilot can withstand depends upon the length of time the acceleration is continued. It is shown that he experiences no difficulty under the instantaneous accelerations as high as 7.8 g., but when under accelerations in excess of 4.5 g., continued for several seconds, he quickly loses his faculties.

Report No. 203 may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.

The Advent of the Big Air Liner

The Air Transport Situation in France Reviewed on the Spot

By LADISLAS D'ORCY

The one thing that immediately differentiates French aviation from American aviation in the eyes of the aeronautical observer freshly disembarked from the United States is the big multi-engined air liner. Both countries have their pursuit ships, and observation planes, and bombers and joy riding planes; and, superficially at least, there is not such a vast difference between a Nieuport 29 "de chasse" and a Curtiss Pursuit or an MB3, or between a Bréguet 14 or 19 and a DH4B or a Douglas Observation plane. Irresistibly we are led to make a mental comparison of the different "opposite numbers" and we quickly feel at home, even though the Lorraine takes the place of the Liberty and the Hispano-Suiza that of the Curtiss or Wright engines. And what with the Reed metal propeller taking its place in France, manufactured by the Levasseur propeller works, the picture is complete.

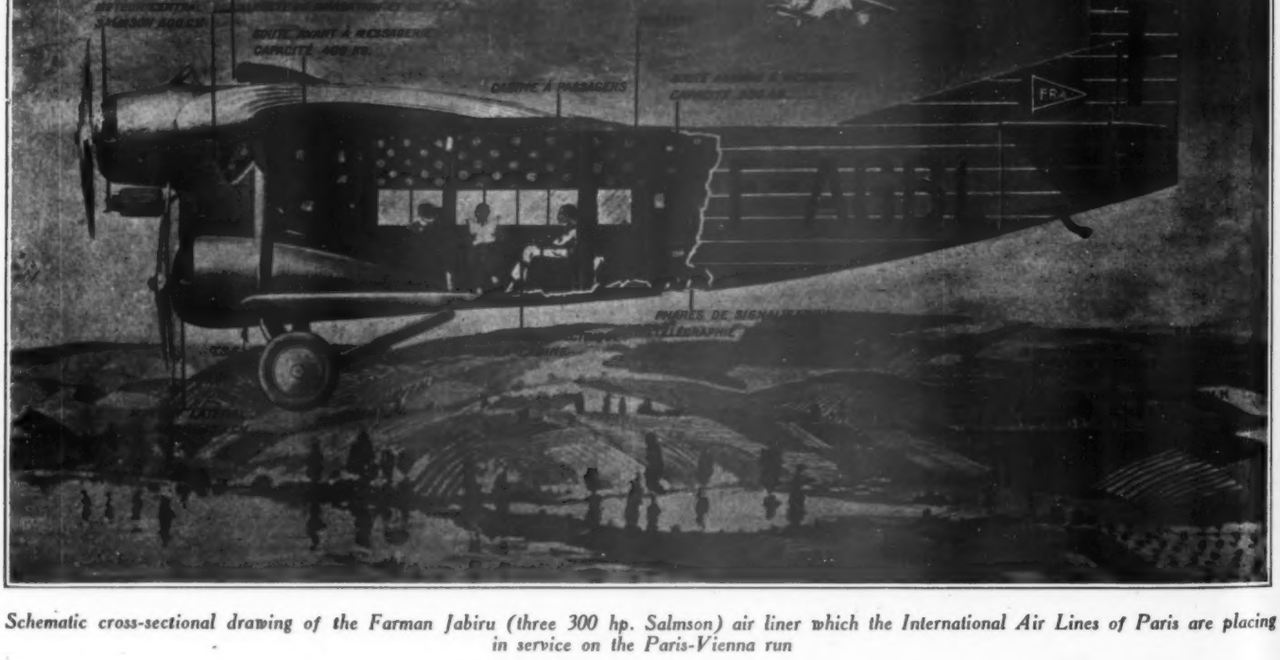
And when it comes to the big air liner, we have no opposite number to fall back upon. This type of ship stands quite alone in France, not only with respect to the United States, but to England, Italy and Germany as well. Germany, of course, is hampered in this development by the clauses of the Treaty of Versailles; but England and Italy appear to have been caught napping.

Began New Policy

When, some four years ago, the Air Department urged French constructors to develop large capacity multi-engined commercial planes, conservative pilots shook their heads over the thousand and one requirements constructors were asked to fulfill. "They are trying to build ocean liners, not flying machines," was the way one pilot put it. Some early attempts, such as the Blériot Mammouth, seemed to justify this pessimism. But time passed and some of the constructors, steadily encouraged by the Air Department, kept faith with the big ship idea. And gradually the clumsy looking and hard flying "multimotors" were tamed by the combined efforts of pilots and designers, and began acting like ordinary flying machines. The Bréguet Leviathan, with four 250 hp. Bréguet-Bugatti engine units mounted in a central engine room and driving a tractor propeller; the Blériot Type 115 with four wing engines; the three-engined Caudron and the Farman Jabiru, were the outcome of this far-seeing government policy.

Safety

Today, when night flying is generally recognized as absolutely indispensable for any long distance airway operation, possession of planes such as the ones above mentioned gives France an immense superiority over its rivals in commercial aviation. It is being gradually realized that the passenger carrier, or air liner, needed for safe, reliable and profitable operation must be a multi-engined ship of considerable carrying capacity. It must be multi-engined (which means more than two engines) to reduce the possible chance of a forced landing to the smallest possible minimum. And it must be large not only to carry a revenue earning cargo but also because considerations of safety require that a crew of not less than three (pilot, assistant pilot-navigator and mechanic) and a complete set of air navigation instruments, including radiophone, be carried on board. All this means a lot of what some still persist in describing as "fancy dead weight." But safety will be served. And after all safety should be the primary consideration in commercial aviation, and particularly in passenger transport, for a single fatal accident occurring in twelve or twenty-four months' operation hurts air transport more than the latter can possibly benefit from the periodically published statistics of ton-miles and passenger-miles safely flown. The newspaper reading public will glance at the statistics, if their small type ever attracts its attention, and forget them in a day or so; but it will remember an aviation accident for weeks and months.



Schematic cross-sectional drawing of the Farman Jabiru (three 300 hp. Salmson) air liner which the International Air Lines of Paris are placing in service on the Paris-Vienna run

That the big French air liners are no longer in the experimental stage is shown by the fact that this year machines of this type will be used by practically all the French air lines. The Air Union, which runs the Paris-London service

and in which there are combined for airway operation the Blériot, Bréguet, Caudron and Morane-Saulnier interests, will put in service a number of Bréguet Leviathans, with four engines. The Farman Air Lines (Société Générale de Transport Aérien), which operate the Paris-Amsterdam service already employ Farman Jabirus. The International (formerly Franco-Rumanian) Air Lines have just added four Farman Jabirus to the ten three-engined Caudron ships which the company uses on its night flying service between Belgrade and Bucharest. The Jabirus will be used on the new route from Paris to Vienna via Switzerland which the company has substituted for the Paris-Strasbourg-Prague-Vienna route to eliminate the hazard of a forced landing in Germany and the resultant confiscation of the machine on the part of the German authorities. When, as a result of the negotiations now proceeding, French-German air relations will be governed by a definite agreement, the International Air Lines expect to resume the Strassbourg-Prague run on the Paris-Warsaw service, as this route is much shorter than the one via Switzerland. Finally, the Latécoère Air Lines, which connect Toulouse with Morocco, also propose to use three-engined air liners when their service will be extended to Dakar, French West Africa. This type of ship which was produced by the manufacturing branch of the Latécoère Company, was described some time ago in the columns of AVIATION. .. .. ..

Schematic cross-sectional drawing of the Caudron C81 (one 400 hp. Lorraine and two 260 hp. Salmson) air liner which the International Air Lines employ on the night run from Belgrade to Bucharest

It will thus be seen that the big air liner is actually entering the arena of European air transport. The factor which was primarily responsible in producing it was, of course, night flying, as was pointed out above. But now that the air lines are carrying ever growing commercial loads—freight as well as passengers—it is becoming evident that single engined ships are already too small to take care of this traffic in a satisfactory manner. M. Bétard, general manager of the International Air Lines, told the writer that last year *three-fifths* of the air freight available between Paris and Vienna had to be refused by the company due to lack of cargo space on its planes, while frequently passengers were refused in order to carry freight, as the latter is more profitable. The large capacity planes which the company is now placing in commission will obviate this drawback.

Future Profits

The steady growth of this air business is a very hopeful sign for the future of commercial aviation. So far, of course, all the air lines have been running at a financial loss which is only made good by the government subsidy. However, the deficit is gradually being reduced, not only because there is a distinct growth in the public's faith in air transport, but also because the new air liners are primarily commercial carriers and not converted or camouflaged military machines. Indeed, looking at the splendid Farman Jabiru, for instance, one cannot help feeling that here is a ship that has primarily been developed for commercial and not for military work, and that this ship is not a camouflaged bomber. A few years back, when the Goliath was in its prime, the French air liners did indeed seem to be camouflaged bombers, for the commercial and the military *variantes* of this ship looked—and still look—like twins from a distance.

But since then a considerable change appears to have come over the French air policy. Today the once highly respected theory that you can build a satisfactory commercial plane while keeping in mind its possible military adaptation in case of war finds but very few adherents. Generally, the theory is exploded. M. Laurent Eynac, the air minister who has so ably directed the French air policy for the last five years, stated last fall very clearly that a commercial plane that is not built for purely commercial ends cannot possibly be a good commercial ship, nor can it be of much use as a military plane. This axiom would not have applied four or five years ago, but at that time most commercial ships were in fact converted war craft. Today the cleavage between commercial and military airplanes in France is unmistakable: the air liner of 1925, with its luxurious appointments, its separate baggage holds and its flying characteristics, has a very distinct personality and but remotely resembles the latest big bomber. Now that the step in this direction has been taken, the air liner and the bomber will more and more develop along original and different lines until the two will no more look alike than the steamship Leviathan resembles the battleship Maryland.

Government Control

Thus, thanks to an enlightened government policy, France is building up alongside its great air force an advanced type of merchant air fleet which will presently sally forth to carry the world's aerial trade. It seems extremely doubtful if private initiative could have achieved this result. The recent story of the American merchant marine rather seems to show that certain industrial activities need active government support. Private initiative can produce aerial flivvers and good ones at that, as America's example shows; but the development of the kind of air liner that is needed for long range passenger transport represents such a huge outlay of consistent developemnt work as seems to be beyond the means of most aircraft manufacturers. Government support of the subsidy kind may stifle initiative and competition—but where there are no competititors it is difficult to see how there can be any competition and initiative does not just spring up from the ground when there is nobody willing or able to assume it.

The writer does not believe that the average Frenchman is more airminded than the average American, but the former certainly does seem more enthusiastic than the latter in the sentimental support he gives the whole subject of aviation. In France there is a very distinct sort of glamor attached to the noble art of flying which is not apparent in America, Whether this is good or bad for aviation, and whether the more sober and "coldblooded" appreciation the American has of flying may not in the end produce the more durable results, remains to be seen. Right now Americans constitute over 50 per cent of the travelers using the Paris-London air lines, Britons come next with some 20 to 25 per cent, while the French only appear in third place and in a proportion about equal to Belgians and Hollanders. But here it should be noted that the Americans who travel by air in Europe are almost wholly tourists who fly more for the experience than because they actually are in a hurry. Businessmen are a conservative crowd and they are only gradually coming to think of air transport as they do of railroads and steamships—but they *are* coming to it, even though they rather ship goods by air than use the air lines themselves. And in this respect the French businessman is no more conservative than the British businessman; both are "from Missouri."

In the meantime, very powerful efforts are exerted to make the French a fully airminded nation. It does not seem to matter whichever political party holds the power, the subject of aviation receives the most wholehearted consideration and support in every case. The daily newspapers, be they large or small, never grudge space to aeronautical matters. The magazines are full of articles popularizing flying and explaining the supreme value of air power for national defense—supreme indeed in a country which could be reached by an aerial invader from almost any country in Europe in a few hours' flight. The significance of international air transport as an agent of civilization and as a moderator of national jealousies and rivalries is also given much attention. Added to that there is the persistent and wide spread propaganda work conducted by scores of private aeronautical bodies, such as the Aero Club of France and its affiliated societies, the Aeronautical League of France with its 100,000 members, the French Committee for Aeronautical Propaganda, the French Aerial Association (which is particularly concerned with light plane and glider development), the French Society for Air Navigation (which gives monthly lectures on technical subjects) and various universities, such as the Sorbonne and high schools, where aeronautical courses are held. All these organizations are blowing with all their might on the sparks of French aerial ardor to turn them into a healthy flame that will lift the whole nation into the air and keep its eyes fixed in the sky—peaceful, but prepared.

New Aeronautical Society Formed

The American Society for Promotion of Aviation has been formed. Its headquarters are 522 Fifth Ave., New York City. The officers of the Society are Thomas L. Hill of the Selling Department, The Shelton Looms, president; Thomas J. Hughes, sales manager of the Radiotone Co., vice president; William S. Iveson, credit manager for the Walworth Mfg. Co., treasurer; Arthur I. Mellin, editor of the *Lace and Embroidery Review*, secretary. Board of Directors: Joseph D. Cass of the Julius Kayser Co.; Frank Sweeney, BoPeep Mfg. Co.; Charles Porter of Chas. R. Porter & Sons; Jno. A. Straley of Dillon, Read & Co.; Wm. P. Taylor, Erkin Danforth Co.; George H. Kimber of the Solvay Co.; Frank L. Hale, Crucible Steel Co.; and Ernest O'Callaghan, Abram Strauss Co.; Henry L. Preston, New York Central Railroad; Arnold H. Eydenberg, Lenox Mfg. Co.; Wm. Cogan, Garvin & Corbett.

Among the officers who are fliers are Hale, Porter, Taylor, Cogan, Kimber, Straley and Hill.

The following statement regarding the origin of the Society and its purposes has been furnished by its President.

"The Society is an outgrowth of "The One Hundred." To be more specific as to who "The One Hundred" may be, I will add that they were one hundred men selected by the Government early in 1917, assembled at Governors' Island and sent to Canada under command of Captain Loening. They were attached to the Royal Flying Corps for training and discipline. When commissioned, as most all were at Camp Hicks, Tex., they were attached to American squadrons and sent overseas, some finishing training in England, others in France.

"Many were in action with British Units. The individuality of their service, the conditions under which they met and worked were such as to develop tradition and sentiment that will never be broken.

"In 1919 Jack Straley, one of the original hundred, started the herculean task of assembling what was left of the old crowd in a yearly banquet. He has been ably assisted in this work by Archie Lochead, John Donaldson, Paul Feutchwanger. The old crowd had been argumented by men coming direct from American ground schools and Americans who flew with the Royal Flying Corps until our annual banquet has totaled about one hundred men coming from many distant points just to do a little barrack flying for an evening with the old gang.

"Between the passing of that which cheers and the click of "galloping dominoes" the greater possibilities of Aviation has been discussed and "The American Society for Promotion of Aviation is the outcome.

"The plan of organization is as follows. It is estimated that there are in this country about 15,000 to 18,000 men trained as pilots during war time by the Army, Navy, Marine and Royal Flying Corps. At the same time there were thousands of men trained as mechanics and riggers. The Society plans to reach these men; provision having been made for our organizing into State Squadrons and local flights, and form them into flying clubs. They would then work to have established in their particular community a landing field or air port. As the Society developed these local organizations, we would advocate that Congress appropriate money which would provide gratis to such a unit properly organized a training machine, either sea or land type.

"This would provide work for our aircraft manufacturers to a certain extent. It would also make easier the opportunity to fly for those that so desired.

"Landing fields or airports in every town will be our slogan.

"We believe that if this is accomplished a tremendous stride in the advancement of aviation will be accomplished.

"In organizing along these lines it is not to be thought that we expect every former pilot to hop into harness again as instructor in these clubs, as they come into existence. Hardly that. Most of the boys who had only themselves to think of in 1917-'18 have others to think of now and in many cases there are younger pilots or pilotesses running about. Though the spirit is willing I am afraid that word will be passed from the head of the house 'no flying.'

"But there is a manner in which every man of air training can be of invaluable service in the promotion of aviation and that is to carry intelligently into his community air information. It is true that there is a certain type posing as airmen who have done a tremendous amount of harm to the cause, not alone by the talk but by some of the stunts they have put over.

"The Society will do all it can to create air publicity and give airmen an opportunity to create converts. We plan educational pamphlets, talks over the radio, by men qualified for such work, publicity of press and motion pictures and we will especially try to reach the boys of the country and instill in them a desire to fly. With flying opportunity within easy reach of the coming generation the air future of this country is safe.

"Men with whom I have been in touch and who will carry on the work of organization in their States, are too numerous to mention but some of the old Hicks crowd wil be glad to hear that Ray Brooks, Massachusetts; Tom Abimathy, Maine; Jack Lathan, Pat Hogan, Louis Rabe and Barton Hirst in Pennsylvania; Alex Tolchan, Ohio; Tom Noonan, Wyoming; Johnson Kenyon, Michigan; Doc. Rolston, Nebraska; Robert E. Lee, Murphy, Kentucky; R. M. Greenslade, Arkansas; Polly Hall, Texas; Walt Ten Eyck, Connecticut; Frank Flynn, California; are some of the old timers I am in touch with. New York and New Jersey are well represented in the Society.

"We are progressing nicely and expect that before 1925 is over to have done much in furthering aviation."

A Correction

Editor, AVIATION:—

We have just read with some interest the article in the Feb. 23 issue of AVIATION, describing the Schneider Bombardment escort plane.

Realizing that AVIATION is considered a reliable historical record, we want to correct a minor point in this article. Near the bottom of the first column you state, "Such a plane was not used during the last war . . ." This is in error. The writer recalls having flown a Letord bi-engine plane which the French had first used for this purpose. This plane was the same basic type, except that it had a center fuselage. Machine-guns turrets were mounted both fore and aft of the pilot. This plane was equipped with 150 hp. Hispano engines and at that time (May 1918) was too slow for escort work with the Breguet day bombing units. Its successor was a Caudron, having two fuselages and higher powered engines. Being a much cleaner job its speed was much higher.

The writer saw no less than twenty of these machines at a French acceptance field, and is quite sure that they were used by the French corps and that a considerable number of them were with the large formation of Oct. 9, in the Meuse-Argonne action.

It is conceivable that some future "alibi artist" might endeavor to excuse a failure to provide bombardment escort planes by reference to your article.

HAROLD F. MARSHALL
Captain, A.S., O.R.C.

Stability and Controllability of Airplanes

Appendix II. Balance Calculation

By B. V. KORVIN-KROUKOVSKY

We have discussed the conditions required for the stability of airplanes and devised the method by which the degree of stability can be estimated from the design data. We have shown that the position of the center of gravity is by far the most important characteristic of the airplane from the stability point of view, and that an average airplane is found usually to be most satisfactory when its center of gravity is located at about 30 per cent of the mean chord. As the center of pressure on the wings of the airplane travels between 30 per cent and 50 per cent of the chord, the lift of the wings and the weight of the machine form a diving couple which must be counterbalanced by the air pressure on the tail plane. The estimate of this diving couple and of the stabilizer setting required to counterbalance it, is the problem the designer must face as soon as the center of gravity is located and the degree of stability is checked and found to be satisfactory. Although it is possible to provide in the design of the airplane for a very wide range of possible stabilizer adjustments and determine the required setting experimentally by flight tests, it is usually not convenient, as very large clearances above and below the stabilizer would increase the parasite resistance, and also because the layout of the control mechanism may be interfered with. In practice therefore the range of adjustment is usually limited to two or three degrees on each side of the normal setting and the designer is expected to keep within about half of this range, leaving some margin for emergencies. The determination of the stabilizer setting required for balance was always considered a very uncertain problem because of the multitude of conditions to be taken into account. Indeed the diving couple depends on the vertical and horizontal location of the center of gravity, on the airfoil used and on the disposition of the wings. The air force on the tail depends on the area, lift coefficient and angle of incidence of the tail plane, the angle of incidence of the wings, the angle of downwash and the slipstream of the propeller. The lift coefficient of the tail probably is considered the most difficult to determine, as great variation is found in the airfoil section and the plan form of the tail planes used by different designers, and one can hardly find model test data on surfaces similar to ones used by him. As a common practice the designers give much more consideration to the structure and appearance of the tail plane than to its problematical aerodynamic properties. The angle of incidence of the wings in flight at a given speed is also a rather indeterminate quantity, because the wing combination of one's machine is usually found to differ from the arrangements found in existing wind tunnel test data. The process of correcting the airfoil characteristics so as to give the properties of the wing combination actually used, is a rather tedious and uncertain process and is rarely attempted in the early stages of design, when all the aerodynamic proportions of the machine are being settled upon. As to downwash there are in existence several formulas giving widely different results, one from another. The best that can be done in this respect is probably to use a certain formula with a certain method of procedure in balance calculations, in very much the same way as different formulas are used for design of the compression members in the cases of a steel bridge, a reinforced concrete building or a strut of an airplane.

In the previous paper we explained some basic aerodynamic relations in regard to the lift and pitching moments of the airfoil, and gave an empirical formula for the propeller thrust. In this paper we will endeavor to show how these relations can be used in estimating the magnitude of the diving couple and the air force acting on the tail plane, and how the setting of the latter can be obtained on the basis of this information. In conducting this study we will write first the basic equation of equilibrium for the diagrammatic airplane, and then will analyze each of the terms of this equation, finally simplifying it and putting it in the form convenient for practical use.

The sketch of the familiar diagrammatic airplane is shown in Fig. 1. Limiting ourselves to the consideration of the lift of the wings and the tail plane and of the effect of propeller thrust, we can write the following condition of equilibrium.

[1] $$M_w - M_t = M_e$$

where M_w is the moment due to wings of the airplane.

M_t is the moment due to propeller thrust.

M_e is the moment due to empennage.

We will denote by M_{we}, M_{te} and M_{ee} the pitching moment coefficients due to the wings, propeller thrust and empennage respectively, defining the moment coefficient as the moment divided by the quantity qSl. Throughout this paper we will retain the notation used in the previous one, adding new notation where necessary. This said, we can now proceed with the analysis of the pitching moment due to the wings. It is evident from the sketch that

[2] $$M_w = F\ (x - p)$$

where $$F = qSC_1$$

The value of x—horizontal distance of the center of gravity from the leading edge of the mean chord—is affected by the angle of incidence and by the vertical distance of the center of gravity from the leading edge. By horizontal and vertical distances, we mean the distances measured parallel and perpendicular to the line of flight. It is easy to see that if the airplane were pitched about a center of gravity located below the wing—the leading edge would move forward with decrease of the angle of incidence, and would move backward with increase of it; the reverse would take place if the center of gravity were located above the wing. It is common practice with designers to determine the position of the center of gravity of the airplane with the thrust line horizontal. The wings of the airplane may be set at angles of attack anywhere from zero to six degrees, and in the normal range of speed in flight the angle of incidence of the wings may vary from a small negative angle to about plus ten degrees. It is desirable therefore to expand the value of x in equation [2] so as to include the effect of pitching. We will denote by x_o, α_o and C_{1o} the values of the center of gravity location, the angle of incidence and corresponding to it value of the lift coefficient when the thrust line coincides with the direction of the flight. Then for any other angle of incidence we can write:

$$x = x_o + \Delta x \qquad \alpha = \alpha_o + \Delta\alpha \qquad C_1 = C_{1o} + \Delta C_1$$

In the previous paper we showed that

$$\Delta x = \frac{\pi}{180} y \Delta\alpha = y \frac{\pi}{180} \frac{1}{n} \Delta C_1$$

substituting $\Delta x = x - x_o$ and $\Delta C_1 = C_1 - C_{1o}$, and solving for x we can write:

[3] $$x = x_o - y \frac{1}{57.3\ n} (C_1 - C_{1o})$$

We will remember that n is the slope of the lift coefficient curve plotted against the angle of incidence, that it is practically independent of the wing section and is the simple function of the aspect ratio of the wings:

$$n = \frac{0.1}{1 + \frac{2}{R}}$$

In the analysis of stability, we assigned to n, in this connection, the average value of 0.070. The consideration of balance requires, however, greater accuracy than the test for stability, and we will use the proper value of n in each case. In expansion of p—the distance of center of pressure from the leading edge—we will make use of the method explained in the previous paper and will write:

$$[4]\quad p = l\frac{p}{l} = l\frac{C_m}{C_1} = \frac{l}{C_1}(0.25C_1 + C_{mo})$$

where C_{mo} is the diving moment coefficient when the lift coefficient C_1 is equal to zero. The values of C_{mo} for several most used airfoils are given in Table 1. The values given are the constants in the linear equation

$$C_m = C_{mo} + 0.25\,C_1$$

rather than actual values of the moment coefficient at the angle of zero lift. In case of the high lift wings both values will be found to coincide, but in case of so called high speed wings like R.A.F.15, the actual values are somewhat lower.

TABLE I

Airfoil	C_{mo}
R.A.F.-15	0.032
Aeromarine 8	0.045
R.A.F.-6	0.062
Aeromarine 2	0.070
Aeromarine 2a	0.073
Eiffel 36	0.073
U.S.A.-27	0.073
Aeromarine 6	0.080
U.S.A.-35	0.087
Gottingen 387	0.096

Substituting expressions [3] and [4] in [2] and dividing through by the quantity qSl we get the following expression for the moment coefficient due to the wings:

$$M_{we} = \frac{M_w}{qSl} = \frac{x_o}{l}C_1 - \frac{y}{l}\frac{1}{57.3\,n}C_1^2 + \frac{y}{l}\frac{C_{1o}}{57.3\,n} - C_1 - 0.25C_1 - C_{mo}$$

or, rearranging the terms:

$$[5]\quad M_{we} = -\frac{y}{l}\frac{1}{57.3\,n}C_1^2 + \left(\frac{x_o}{l} + \frac{y}{l}\frac{C_{1o}}{57.3\,n} - 0.25\right)C_1 - C_{mo}$$

Now we can consider the second term of equation [1] representing the effect of the propeller thrust. We stated in the previous paper that the thrust of the propeller at different air speeds within the flying range can be very closely approximated by the empirical formula

$$[6]\quad T = P\,(k_1 - k_2V)$$

or, expressing V in terms of C_1 and W/S and bringing out $qS = W/C_1$:

$$[7]\quad \frac{T}{qS} = \frac{P}{W}\left(k_1C_1 - k_3\sqrt{\frac{W}{S}C_1}\right)$$

hence the moment coefficient due to thrust will be:

$$[8]\quad M_{te} = \frac{T}{qSl}\frac{y'}{} = \frac{y'}{l}\frac{P}{W}\left(k_1C_1 - k_3\sqrt{\frac{W}{S}C_1}\right)$$

The empirical coefficients k_1, k_2 and k_3 are constant for each engine-propeller combination and are found to depend on the rated horsepower and r.p.m. of the engine as follows:

$$k_1 = \frac{60.5}{P^{0.32}\,(rpm)^{0.23}}$$

$$k_2 = \frac{4.32}{P^{0.21}\,(rpm)^{0.68}}$$

$$k_3 = \frac{85.5}{P^{0.21}\,(\text{rpm})^{0.68}}$$

The values of the coefficients given above correspond to the speed expressed in miles per hour and to the standard density of the air $\rho = 0.00237$. For the convenience of the reader these coefficients were computed for several well known engines and are given in the Table II. The horsepower and r.p.m. data for most of the engines in the table do not represent the maximum output of the engine, but merely the combination of horsepower and r.p.m. which was reported by the manufacturer or which was used at one time or another. Slight variation of the horsepower and r.p.m., however, will not affect appreciably the values of the coefficients. The formulas [6], [7] and [8] will be found to give very accurate results when the propellers are proportioned so as to absorb the rated horsepower of the engine at rated r.p.m. and at the maximum speed of the airplane in level flight.

We said at the beginning of this paper that the lift coefficient of the tail plane is usually considered to be the most uncertain quantity in the estimate of balance due to the lack of wind tunnel test data on the plan forms and sections used by individual designers. We emphasized, however, throughout these two papers, that the lift coefficient curve when plotted against the angle of incidence has constant slope practically regardless of the airfoil section and depending only on the aspect ratio. The tail surfaces are no exception to this rule, and, moreover, in case of the symmetrical sections the lift is zero at zero angle of incidence hence the lift coefficient curve passes through the origin and we can write

$$C_1' = \delta\, n'$$

where δ is the angle of incidence of the tail plane and n' is the slope of the lift coefficient curve for the tail plane:

$$n' = \frac{0.1}{1 + \frac{2}{R'}}$$

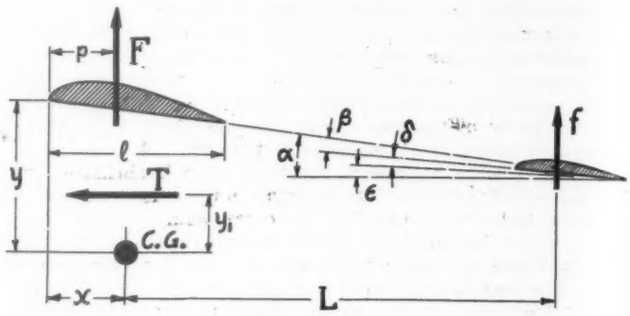


Fig. 1

As we define the effective aspect ratio of any airfoil as its span squared divided by the area, this definition automatically takes care of an unlimited variation of plan forms of tail planes. *Any plan form of the tail plane will give the same effect as far as the lift is concerned as long as its area and span are kept constant. The span and the area of the tail plane then are the only two important characteristics of the tail plane to be considered in the stability and balance estimates.* Of course a square tail will give more drag than an elliptical one, and the section of the tail will also have marked effect on its drag, but this will affect neither stability nor balance of the airplane appreciably, and therefore need not be considered in this paper.

So far we had in mind only symmetrical tail plane sections, but the same discussion will apply to any airfoil section provided we measure the angle δ from the zero lift position of the airfoil. For any definite airfoil section we can obtain the angle of zero lift from the wind tunnel test reports, practically regardless of the aspect ratio and plan form of the airfoil. For rather the thin and flat sections, cambered only at the leading edge so as to make one side flat, so often used on account of their structural simplicity, the zero lift angle is estimated from flight rests to be about minus 1.5 deg. The designer can sometimes utilize this property of the cambered surfaces for the simplification of his structure. If he placed his wings at, say, an angle of 3 deg. to the upper longerons of the fuselage, and stability and balance calculations require the setting of symmetrical stabilizer at minus 1.5 deg. to the wing chord, he may use a stabilizer cambered on top and flat on the bottom and place it directly on the longerons. It is hardly necessary to state that the stabilizer does not become "lifting" just because it is cambered, and that the direction of its effort is determined by its setting, which in turn depends on the position of the center of gravity.

(To be continued)

Hamilton Aero Changes Address

On March 1 the Hamilton Aero Manufacturing Co., manufacturers of quality propellers, have moved from 37 Erie Street, Milwaukee, Wis., to 60 Keefe Avenue of the same city. This change affects both the office and the factory.

Cross License Agreement Upheld

Attorney General Sargent Renders Important Opinion

Under the opinion issued by Attorney General John G. Sargent, copy of which has been received by Representative Randolph Perkins in response to a call which the Congressional Aircraft Committee made some months ago, the acts and attitude of the Manufacturers Aircraft Association, which has been frequently referred to as the "Aircraft Trust," have been completely sustained.

Attacks on the Manufacturers Aircraft Association and the so called Cross License Agreement have persisted since the genesis of this agreement in 1917 and formed the principal part of accusations, which resulted in the authorization by Congress, early last year, of the inquiry into the alleged aviation monopoly. Attorney General Sargent's opinion, which is addressed to the Secretary of the Navy, has actually been before the officers of the Department of Justice since 1922 and, particularly during the period of public hearings by the last Congressional Committee, was subjected to the most searching study and analysis.

"This opinon effectually approves the legality of the Cross License Agreement, of the moral and patriotic worth of which, I and other members of the Committee, were convinced," said Mr. Perkins, who was Chief Examiner and Chairman of the Sub-committee on Procedure of the Congressional Aircraft Investigating Commitee. This opinion sustains opinions previously rendered by Attorney General Gregory and the Hon. Charles E. Hughes, who in 1918 acted as Special Aircraft Investigator for the Government.

"Testimony given before our Committee indicated that for seven and a half years, denunciation of American aviation has centered principally about this Cross License Agreement which was alleged to be the instrumentality of the 'Aircraft Trust.' Evidence presented to the Committee convinced members that instead of there being an 'Aircraft Trust,' which had robbed the Government of millions of dollars, as frequently alleged, the aviation industry has practically disappeared and it is certain that its final destruction was being accelerated by these persistent attacks.

"Analysis of Attorney General Sargent's opinion shows that instead of the Government having been muleted out of large sums of money, the Government itself, under this agreement, is still a debtor to the owners of the patents to a considerable sum. Our investigation was the ninth major inquiry into aviation since the war. It is gratifying to us to receive through Attorney General Sargent's opinion, confirmation of the impressions which I know members of the Committee share with me. I hope that the apparently inspired recurrent attacks upon the development of American aviation, through unwarranted statements regarding the imaginary 'Aircraft Trust,' may now cease."

As to the past, Attorney General Sargent in his opinion, in referring to the agreement entered into between the Government and the Association for licenses for the use of patents under the Cross License Agreement, says the Secretary of War *"distinctly recognized the patents grouped in the Manufacturers Aircraft Association and expressed the desire to proceed with the use of such patents. * * * * Indeed, several agencies of the Government appear to have collaborated and cooperated in creating the conditions established by the Cross License Agreement and the Supplement thereto. It is obvious that the Government was fully informed of the patents that there was no 'purpose deliberately to take property of another without the intention that he should be compensated,' and there was assent by the patent holders that the patents be used at a definitely established rate to be paid for the uses that ensued. All the elements found by the Supreme Court to be necessary to the implication of a contract were present, and in my opinion the use by the Government is to be assumed as having been a use under such a contract and not a tortious use."*

In view of the above, the Attorney General is of the opinion that with reference to the past, it is unnecessary and possibly would be objectionable, to substitute for the existing contract a new form of contract proposed by the Navy Department. *"If you and the Secretary of War are able to determine from the records the number of airplanes equipped with these patents, which had been heretofore manufactured, imported or used by the Government, without the payment of royalties and also, if you are able to agree with these 'associates' as representatives of the owners of such patents, upon a reasonable price to be paid as royalty for the use of such patents by the Government, then there can be no objection to the embodiment of such understanding in an agreement in the nature of an account stated."*

As to the future, the opinion states, "You may, with entire propriety, enter into a contract * * * for the payment of royalties upon all airplanes to be manufactured or used by the Government in the future."

The expressions contained in the opinion of the Attorney General ratified and confirmed the relations which have heretofore subsisted between the Government and the Manufacturers Aircraft Association, inferentially expressing an approval of the manner in which the patents thus grouped together under unitary control have been operated by the Manufacturers Aircraft Association in their relations with the aircraft industry and with the Government of the United States.

It confirms the contention that the Government is obligated to pay the amounts provided for under the Cross License Agreement, when the patents are used by the Government or on its behalf, and leaves the settlement for such uses, for which payments have not been made, as a mere matter of detail and accounting under the existing contract, properly within the jurisdiction of the Comptroller General.

It confirms in the Secretary of War and the Secretary of the Navy, the authority and propriety of making arrangements for future uses as entirely within the provinces of administrative or executive discretion and reduces it to a question of negotiation satisfactory to the parties involved.

New Farman Engine Passes French Tests

The new Farman 500 hp. type 12 WE engine has recently completed a 240 hr. duration test officially controlled by the Military Technique Section at Chalais-Meudon. On the completion of this test, the engine was dismantled and found to be in perfect condition.

The horsepower developed during those tests was as follows: 358 hp. at 1500 r.p.m., 405 hp. at 1650 r.p.m., 455 hp. at 1800 r.p.m., 485 hp. at 1935 r.p.m., 520 hp. at 2050 r.p.m. and 542 hp at 2150 r.p.m. The fuel consumptions corresponding to these powers were as follows: 0.60 lb. per hp./hr. at 1800 r.p.m., 0.54 lb. per hp./hr. at 1900 r.p.m., 0.50 lb. per hp./hr. at 2000 r.p.m. and at 2100 r.p.m. and 0.51 lb. per hp./hr. at 2150 r.p.m.

Farman engines of this type are now being mounted in the following French Military Airplanes: Farman Goliath (World's Duration Record), Farman Night Bomber, four engines 2000 hp., Farman FX Monoplane, Breguet 19A2, Breguet 19B2 Monomotor, Potez 24A2 Monomotor, Bleriot Limousine, Descamps A2, Levasseur Torpedo-Plane, Dewoitine Commercial.

Another Aerial Dare Devil Killed

Jose Fonseca, the Mexican aviator noted for his flying feats, who has been on an advertising flight over the republic, was killed March 1 with his pilot, Fierros, a former cadet in the Mexican air forces, when the engine died during a loop and the plane crashed at Mazatlan, State of Sinaloa. Fonseca was known in California as the "Mexican dare-devil" being one of the first aviators to walk on the wings while his plane was speeding aloft.

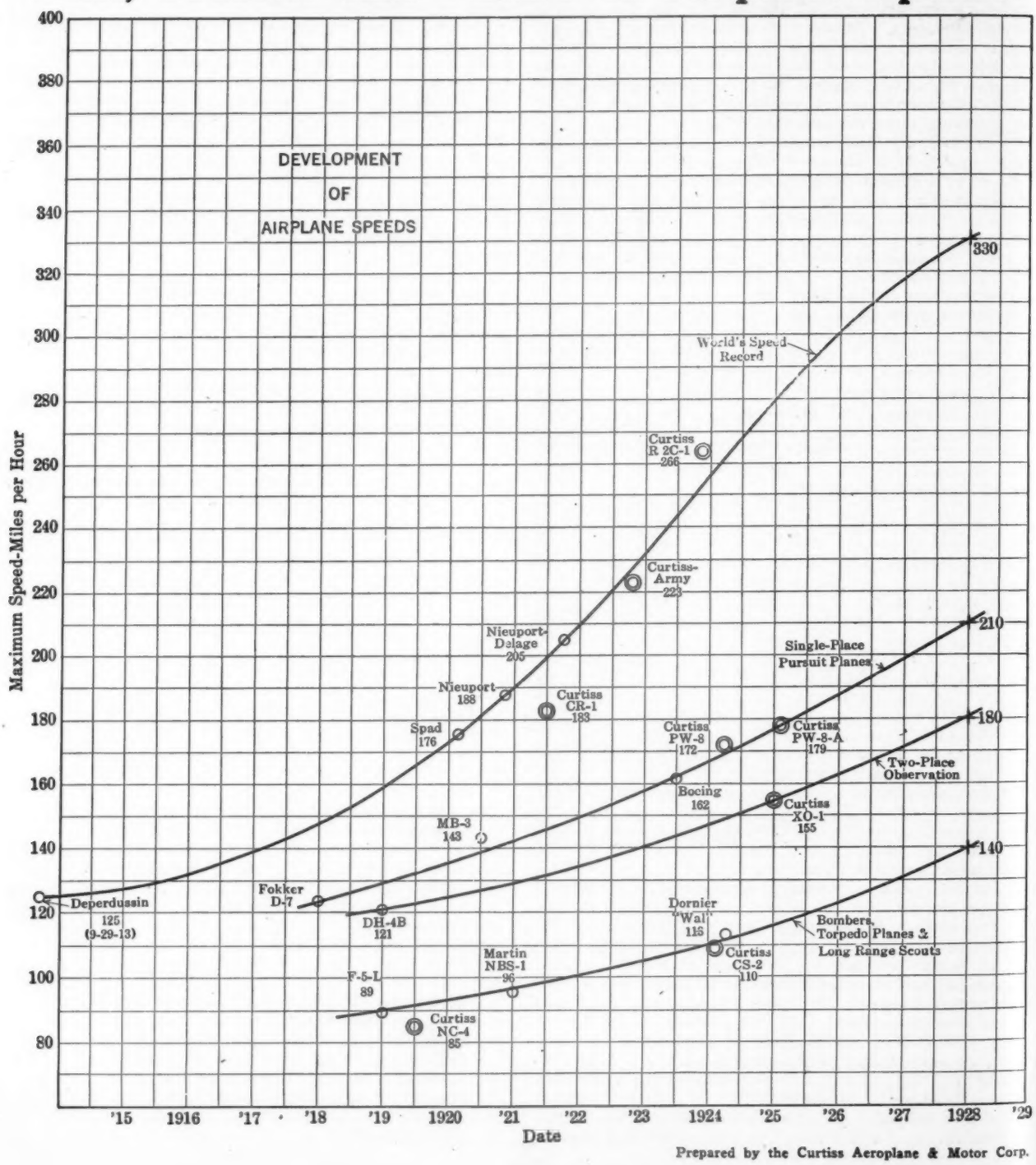
New Instruments Aid Airplane Mapping

Two new instruments, a magnifying stereoscope and a camera lucida, have been designed and built by the Bureau of Standards, Department of Commerce, as aids in map making by means of airplane photography.

The stereoscope, built for the Coast and Geodetic Survey, is to be used in picking out triangulation stations when airplane photographs are used to supply details for a map based primarily on a ground survey. Such stations are generally flag staffs, church steeples, and other high objects, which are very prominent when viewed from the ground but are often hard to locate in the photographs. The stereoscope makes high objects stand up in a very conspicuous manner. Bushes look as tall as poplars and curbs like garden walls. No difficulty is found in locating the desired landmarks. This exaggerated effect is secured by using two photographs under the stereoscope, those often having been taken several miles apart. The instrument is so arranged that the overlapping portions of these two can be brought together to the eyes. It also has lenses capable of magnifying the photographs by from 3.5 to 9.5 diameters.

The camera lucida is used for transferring points to the map in cases where a line map is to be made and not a photograph. It is especially designed to correct for the variations in scale and for the distortion due to roll and pitch of the plane which are unavoidable in airplane photography. The photograph, horizontalized and brought to the proper scale, is projected upon the map and the desired points and lines are traced in with a pencil.

Past, Present and Future of Airplane Speeds



Prepared by the Curtiss Aeroplane & Motor Corp.

Bids and Awards

Airplane Parts

The following awards have been made by the chief of air service, U. S. Army, Washington, for miscellaneous airplane parts, under cir. CAS-82, bids for which were opened Feb. 9:

International Tool Co., Dayton, Ohio, item 13, 54c; 23, $1.20; 35, $1.70; 36, 93c; 37, 93c; 45, $1.40; 46, $1.40; 54, $15; 59, $5.25; 60, $5.25; 66, 58c; 67, 42c.

Rock Island Arsenal, items 4 and 5, $1.90 ea; 32, $5.60; 42, 6c.

Balyeat-Jenks Co., Cleveland, item 3, $2.85; 12, 34c; 14, 37c; 15, 37c; 16, 75c; 24, $2; 33, 49c; 38 to 41, inc., 40c.

Bath Iron Works, Bath, Me., item 2, 68c; 6, $10.66; 10 and 11, $1.63; 20, 92c; 25, $31.50; 26, $8.17; 27, $8.17; 28 and 29, 61c; 30, 15c; 43 and 44, 34c; 48 and 49, 60c; 50, 12c; 51, 13c; 52 and 53, 15c; 57, 29c; 58, $27.25; 61, 69c; 65, 29c; 68, $27.25.

National Steel Products Co., Dayton, Ohio, item 9, 3c; 34, 36c; 47, $2.80; 55, 12c.

Cox-Klemin Aircraft Corp., Baldwin, L. I., item 7, 70c; 18, 28c; 19, 34c; 21, 73c.

Curtiss Screw Co., Buffalo, N. Y., item 22, 7c; 64, 30c.

Eberhart Steel Products Co., Buffalo, N. Y., item 17, 3.2c; 31, $1.40; 62, $6.81; 63, $6.81.

C. H. Cowdrey Machine Works, Fitchburg, Mass., item 8, 95c.

Foote Bros. Gear & Machine Co., Chicago, item 8, $7.05.

Curtiss Screw Works, Buffalo, N. Y., item 5, 12.56c; 6, 14.05c; 7, 13.26c; 52, $.0088; 53, 1.3c; 54, 1.75c.

Avon Tool & Machine Co., Dayton, Ohio, item 11, $8.

G. Elias & Bro., Buffalo, N. Y., item 2a, $6.50; 2b, $6.75.

National Steel Products Co., Dayton, Ohio, item 1, $2.50; 3a, $3.40; 3b, $3.50; 4a, 35c; 4b, 40c; 10, $13.25; 148, 39c; 149, 42c; 150, 45c; 162, $1.25.

Curtiss Aero and Motor Co., item 9, 19c; 165a, $6.50; 165b, $6.65.

Insignia

The contract for furnishing insignia colors, bids for which were opened Feb. 17, under cir. CAS-85, by the chief of air service, U. S. Army, Washington, has been awarded to E. I. du Pont de Nemours & Co., item 1, 29.7c; 2, 17.8c; 3, 16.8c.

Supercharger Gages

The only bid received Jan. 27 at McCook Field for furnishing 50 supercharger gage units, under pro. 33, was that of the Pioneer Instrument Co., Brooklyn, in amount $89 ea; accepted.

The following awards have been made by the bureau of supplies and accounts, Navy Department, Washington, for miscellaneous supplies, bids for which were opened under special 900 schedule openings:

900-9139, Feb. 6.

Aircraft propellers:

Hartzell Walnut Propeller Co., Piqua, Ohio, $26,687.50.

Aircraft storage batteries:

Willard Storage Battery Co., Cleveland, Ohio, $11 ea.

900-9130, Feb. 4

The G. & O. Mfg. Co., New Haven, Conn., water radiators, $3,714.10.

900-9129, Feb. 2

Aeromarine Plane & Motor Co., Inc., Keyport, N. J., aircraft propellers, $4,625.

900-9093, Jan. 31.

Air compressor parts, canceled.

900-9109, Jan. 28.

Star Compass Co., Dorchester, Mass., modification of compasses, $2,200 cost plus.

900-9101, Jan. 26.

Van Blerck Motor Service Co., Philadelphia, parts for gas engines, $3,082.

900-9117, Jan. 26.

Electric Storage Battery Co., Washington, Wood separators, $14,913.84.

900-9100, Jan. 23.

Parts Liberty engine:

Eberhart Steel Products Co., Buffalo, N. Y., item 4, $187.50.

Meisel Press Mfg. Co., Boston, items 1, 2 and 3, $615.

National Steel Products Co., item 5, $60.

900-9088, Jan. 21.

Blanchard Instrument Co., Cambridge, Mass., drive unit, $665.

900-8920, Jan. 16.

Pioneer Piping Co., Pittsburgh, chemical purification outfit, $12,800.

900-9042, Jan. 2.

Whitlock Coil Pipe Co., Hartford, Conn., after liquifier, $14,350.

The following bids were received on dates indicated by the bureau of supplies and accounts, bids for which were opened under special schedules:

900-9196, Feb. 19.

Item 1, 50 tachometers; 2, 50 engine gage units; 3, 100 air speed meters; 4, 150 pitot-static tubes.

The Motor-Meter Co., Inc., 15 Wilbur Ave., Long Island City, item 2, $71.25 ea; total, $3,562.50, 90 days.

Pioneer Instrument Co., 754 Lexington Ave., Brooklyn, item 1, $47.80; 2, $58; 3, $79; 4, $3.45; total, $13,707.50; 120 days.

Life Coats

Under bids opened Feb. 3, cir. QR-78, by the chief of air service, U. S. Army, Washington, the contract for 100 kapok life coats has been awarded to Mark Cowen Co., 787 Bdwy., New York City, item 1a, $5.65; 1b. $5.65; 1c, $6.01.

Engine Parts

The contract for furnishing parts for Wright engine under cir. 37, bids for which were opened Feb. 13 by the engineering division, air service, McCook Field, Dayton, Ohio, has been awarded as follows:

Wright Aero Corp., Paterson, N. J., item 1, $48.56.

National Steel Products Co., Dayton, Ohio, item 2, $17.50; 3, $3.00; 4, $4.75; 5, $4.50; 6 to 9, 30c ea; 10, 16c.

Accessories

The following awards have been made, under cir. CAS-77, by the chief of air service, U. S. Army, Washington, for aircraft accessories and parts, bids for which were opened Feb. 2:

National Steel Products Co., Dayton, Ohio, item 152, 85c; 165, $11.75; 166, $2.50; 134a, $2.50; 134b, $2.50.

Balyeat-Jenks Co., Cleveland, item 155, 15c; 164, $5.45.

Pioneer Instrument Co., Brooklyn, item 163, $12.90.

Eberhart Steel Products Co., Buffalo, N. Y., item 156, $1.25.

Airplane Clevises

The following awards have been made by the office of the chief of air service, U. S. Army, Washington, for miscellaneous airplane clevises, under cir. CAS-79, bids for which were opened Feb. 2:

Avon Tool & Machine Co., Dayton, Ohio, items 1 to 4, 18c.

Balyeat-Jenks Co., Cleveland, items 37 and 38, 35c.

Balyeat-Jenks Co., Cleveland, item 37, 35c; 38, 35c.

Avon Tool & Machine Co., Dayton, Ohio, items 1 to 4, 18c ea.

Parts

Under bids opened Jan. 26 by the office of chief of air service, U. S. Army, Washington, the following awards have been made under cir. CAS 75.

International Tool Co., Dayton, Ohio, item 2.

Lunkenheimer Co., Cincinnati, Ohio ,items 17, 42, 43, 44, 126, 129, 130, 131 and 160.

Balyeat-Jenks Co., Cleveland, Ohio, items 45, 59, 69, 70, 71, 135 and 136.

Pollak Mfg. Co., Arlington, N. J., item 127.

Eberhart Steel Products Co., Buffalo, N. Y., items 72, 73, 123 and 128.

Mueller, Port Huron, Mich., items 124 and 125.

National Steel Products Co., Dayton, Ohio, item 132.

Tires

The contract for furnishing tires and tubes under cir. CAS-80 bids for which were opened Feb. 2 by chief of air service, U. S. Army, Washington, has been awarded to the Goodyear Tire and Rubber Co., Akron, Ohio, item 1, 500 inner tubes, 98c; 2, 600 airplane casings, $19.70.

AIRPORTS AND AIRWAYS

Long Island, N. Y.

C. S. Jones of the Curtiss Exhibition Co. made a flight to Washington, D. C., on Saturday, March 28, carrying N.T.G. (N. T. Granlund) the famous announcer of radio station WHN. N.T.G. had urgent business in Washington and using the air every day in his profession he naturally turned to it for rapid transportation.

On the return flight the next day, Casey brought Miss Lena Basquett of the Follies back to New York. Miss Basquett had just completed an engagement in Washington and had to be back in New York to begin another one on Sunday, so she very cleverly utilized the airplane to enable her to be on time for both engagements without a tiring railroad journey. A standard Curtiss Oriole was used for both flights.

The Curtiss Exhibition Co. is planning to have two subsidiary fields in addition to Curtiss Field this summer. One will be located on the Long Beach road below Rockville Center and the other on the Jericho Turnpike near Mineola. These fields will be operated mainly over the week-ends to take care of the great rush of business. During the week the crowds can generally be handled at Curtiss Field.

Toledo, Ohio

By F. D. LaPeer

The Toledo airport at Reuthinger Field is one of the best fields in the country, being a four-way field about a mile square. It lies about three miles from the heart of the business district, south by east. It is marked by a large Tee and a wind cone. There is a machine shop and a 250 gal. gas truck always on the job. Visiting ships are always welcome to come and stay as long as they like at no charge.

The veteran pilot, Art Smith, who is now flying the mail on the Chicago-Cleveland run, was a visitor recently as was Mr. Lindsey of the Lindsey, Woodson Aircraft Co. of Bryan, Ohio. Louis Brown has just received his new Lawrance engine and hopes to have his new ship in the air shortly. Okey Bevans left on March 23 for the mountains and Pikeville, Ky. Pat Shaugnessy has his Standard all dolled up and ready for the summer's grind.

The Toledo Aircraft Co. has sold eighteen airplanes of various types to fifteen different customers in the last few months. Most of these planes were delivered by air, some of them being flown as far as Nebraska and Kentucky.

French Statistics

The increasing safety of commercial airplane services is strikingly brought out in figures just released by the French Ministry of Aeronautics, says Commercial Attache Chester Lloyd Jones in a report to the Department of Commerce from Paris. These figures disclose that French airplanes traveled more than three and a half million kilometers and transported 16,729 passengers with only five accidents and a loss of five lives in 1924. The conclusion drawn out of this performance by the French Press is that commercial airplane travel is as safe a means of travel as the railways or automobiles.

Pratt and Haviland, Kan.

Larry Ruch, formerly of Haviland, Kans., has moved to Pratt, Kans., now and reports that they now have two Standards operating from Pratt and have a hangar a mile and one half south of town. Visiting pilots are welcome. R. A. Burt also of Pratt has a Standard and they are planning on forming a flying circus and operating from this place. The month of March has been very windy in Kansas and very little flying has been done.

Byron Yeoman of Haviland, Kans., who owns an OXX6 Standard has been on the sick list for the last week and has not been flying.

Willie Toadvine, a pilot of the New Swallow owned by Toadvine and Frankhauser of Haviland, is at the present time building a hangar at Haviland.

Dayton, Ohio

By Maurice C. Hutton

Lieut. Frank O. Hunter, "ace" of the World War and a crack pilot of the First Pursuit Squadron, narrowly escaped death here last week when the new Curtiss pursuit ship, PW8B, crashed from an altitude of 3,500 ft. He saved his life by using a parachute in a 2,000 ft. jump. The plane landed upside down between two small buildings and was completely destroyed. It barely missed five gasoline storage tanks containing 100,000 gal. of fuel. Hunter alighted about a quarter of a mile away and had his 'chute bundled up before would-be rescuers arrived.

In describing his experience to the correspondent for AVIATION Hunter reported that he lost control of the tail surfaces as he zoomed up preparatory to executing a barrel roll. "The nose dropped down and the plane started into an upside down spin," he said. "I was at an altitude of 3,500 ft. Not a thing that I did seemed to bring the ship back into control. It was spinning slowly with me on the underneath side. I stayed with it until I saw it was impossible to regain control and then opend my safety belt. I naturally fell downward headfirst and the force of the spin threw me clear of the ship. I don't know what position I was in when the 'chute opened. I didn't see the ship any more although I did hear it crash."

The PW8B was the last word in fighting equipment. It was similar to the PW8A which Lieutenant Stoner flew in the 1924 Pulitzer race except for the new set of wings. Hunter had been at McCook Field several days testing it and the new Boeing pursuit.

A remarkable thing in connection with the crash was that the duralumin propeller was only bent although it received the brunt of the shock.

Lieutenant Hunter was the fourth aviator from McCook Field to save his life by using a parachute in an emergency. The others were Lieuts. Harold R. Harris, John A. Macready who made a spectacular leap at night, and E. H. Barksdale. Walter Lees, chief pilot of Johnson's Flying Service, escaped a crash in the same manner when a fire extinguisher jammed the controls of an ex-German war plane.

Service tests of the new Loening amphibian plane at McCook Field are practically completed. They were made by Capt. Louis Meister, Air Service Reserve. During a try for ceiling, Meister reached a height of 16,000 ft. thereby establishing an unofficial altitude record for this type of ship. According to Lieut. W. H. Brookley who delivered the job here from the east, it maneuvers easier and is faster than a DH.

McCook and Wilbur Wright Fields were hosts to a group of distinguished Japanese officers recently. The visitors from the Orient were: Col. S. Fuchui, of the Japanese air force; Lieut. Col. S. Uchida of the army and Capt. K. Abe, assistant military attache at Washington.

The new Canary commercial passenger-carrying ship designed and built by the Johnson Airplane & Supply Co., has been completed and is now undergoing thorough performance tests. E. A. Johnson, president of the company, reports that a complete announcement will be made within a short time.

Sacramento, Calif.

By E. W. Kelly, Jr.

Ingvald Fagerskog practically started the flying season here last week when he brought the Eternal Flapper, Edna Wallace Hopper, to Sacramento from San Francisco via the air route. Motion pictures were taken of the trip and were shown the same night at one of the local picture houses. As a result of this, Ingvald reports a large amount of passenger work the following Sunday. Ingvald, who operates indirectly from the Del Paso Field here has nearly finished the construction of a new hangar. This hangar has a capacity of

four ships, and by all outside appearances looks as though he intends to keep it full.

Carl Smith, or Smithy, has overhauled his Jenny and expects to have it flying at the end of next week. "Bill" Sanders also has recovered his ship and will have it ready for the air in a short time. "Andy" Andrews, who has charge of Geo. Sniders' field on the upper Stockton Road, reports that he will have a Hisso Standard on the field in about two weeks. Andy and Eddie Angel are both kept busy these days getting ready for the "summer rush."

Ed. Kelly has purchased the Jenny formerly owned by W. E. Sanborn of Winters, Calif., and is going to rebuild it in a short time. Frenchy Ledoux has his ship all repainted and is flying it regularly on Sundays. Obe Tucker has a new Jenny on the field at Del Paso Park.

Cincinnati, Ohio

By E. F. Marsh

Charles E. Lay announces an unnamed gift of $50,000.00 for the establishment of an "Aeronautical University." What, Where and When together with How are the problems in this connection to be worked out.

Mr. Lay stated he would place the donors proposition before all the leading aeronautical engineers of the country, together with other leaders, as soon as possible to see what, if anything, could be done.

* * * *

John D. Sage, president of the Union Central Life Ins. Co., also president of Grisard Field Co., announces the gift of a 200 acre tract of land in Turkey Bottoms by a Cincinnati manufacturer for a flying field. This field is well known to pilots, being Cincinnati's first field used by C. E. Lay in his first activities here late in 1918 and recently a polo field. An article in the *Cincinnati Post* indicates that it will be turned over to the Government and that there will likely be a "Hells Half Acre" permitted. Grisard Field at Blue Ash will be retained by the Grisard Co., says Mr. Sage.

* * * *

The big announcement comes from over the river, Messers Court and Delehanty having formed the Crescent Aviation Co., and this is to be a real commercial project, where manufacturers, private owners, pilots and any old body "just for being good" and perhaps a small fee can set their "Ole Crate" down in contentment and preach the good will of their wares undisturbed. Its location is Fort Mitchell, Ky., five cent carfare to Cincinnati and on the Dixie Highway, twenty minutes from Fountain Square, Cincinnati.

The first ship was moved in by "Dixie" Davis, who reached Cincinnati Saturday from Kansas City, Mo., and did a nice passenger business Sunday afternoon. The ship soon had a crowd of some 5,000 assembled. This field will officially open March 29, weather permitting, with some 20 ships participating and speeches by the prominent people.

Boston, Mass.

The War Department report on the official inspection of the Airport made by Col. George D. Moore, I.G.D., on Jan. 8 was received recently and pays tribute to Lieut. Robert J. Brown, Jr., its commander, stating, "The conduct of the Boston Airport is very satisfactory. Commendation is due the commanding officer for his efficiency in administration and management." Lieutenant Brown said that the credit for the excellent condition of equipment at the port is due to Staff Sergt. George E. Schmidt who has been in charge of the detachment at the field from its beginning and to Chief Aviation Mechanic John F. Breen.

By wire Lieutenant Brown has received word that a new DeHaviland 4B is ready for delivery to Boston Airport authorities at the Air Service Supply Depot at Fairfield, Ohio. Lieut. James H. Doolittle has been named to proceed to Ohio to fly the plane there.

Two new JN training planes are expected by freight any day and four additional JN's have been promised Boston in May.

Lansing Mich.

Forty aviators from every section of Michigan, representing practically every operating company assembled in the committee rooms of the Kern's Hotel in the afternoon. Plans of the various officials of the operating companies, and individuals were freely discussed and their programs were exceeding interesting. A sumptous banquet was held in the dinning room of the Elks Temple at Lansing and delegates freely discussed the various phases of commercial aeronautics and the vital need, for an association to protect, champion, and further exploit the interests of those who are now engaged, and those who will eventually become interested, in things aeronautical financially.

Officers of an organization to be known as the Michigan Commercial Aviators Association were elected as follows: J. L. Burns, President, Lansing— E. H. Goff, Vice-President, Battle Creek— Talbert Abrams, Secretary and Treasurer, Eaton Rapids. Committees were formed to draft bylaws, aid in securing landing fields for municipalities that would be available for all flyers, sponsor air meets in various communities so that commercial operators could not only carry out an educational program, but receive some monetary remuneration, exploit the U. S. Air Mail Service for Michigan and perfect a system of Model Airways in Michigan whereby passengers wishing to avail themselves of airway transporation could take advantage of those companies operating within their districts with the least possible delay, also the association will act as a clearing house for all plans tending toward the betterment of this commercial service and a broadcasting station for all aeronautical information. Membership in the organization will be limited to pilots, owners and the heads of those organizations interested in aerial transportation commercially. Charter membership for regular members was placed at $1.00.

It will not be the policy of this newly formed organization to take over the work of the National Aeronautical Association or any other existing organization or attempt to parallel the work they are attempting. As a fraternity of the trade it will by closer cooperation and co-ordination of efforts centralize its forces in an effort to reduce those losses incidental to operating in sections where certain local conditions have prevented other companies from registering a fair financial return for the effort expended. Its endorsement as to the ability of pilots in Michigan will be much sought after for only those who have proven ability, passed strictest mental and physical tests and are known to be conscientious, careful and consistent in their flying will be granted a rating by the Association. An effort to stabilize prices on the system of Model Airway's being planned for the coming season is hoped to materially adjust prices on an equitable basis which will eventually become of mutual advantage to operators and patrons as well.

This is the first effort made in Michigan to band together those widely scattered companies and individuals, and, eventually the organization will be the local unit of a national organization for it is only by this exchange of cooperation that an organization of mutual benefit to every person in the great commonwealth of Michigan, be they members of this Michigan Commercial Aviators Association or those who will benefit by this new efficient, speedy and practical mode of transportation can be built up.

Dirigible Airship Base in India

Following the arrival in India of a commission of three members from the Air Ministry to select a base for experimental flights in connection with the proposed England-to-India air service, the Karachi Chamber of Commerce held a conference with the commissioners and advanced the claims of that city as the Eastern terminus of the new dirigible airship service, Vice Consul W. B. Douglas advises the Department of Commerce. Generally stated, these were to the effect that although Bombay is the principal commercial center and offers better facilities for the distribution of aerial passengers and freight by rail and sea, Karachi is undoubtedly superior as an aerial port. A military aircraft depot is already located there, and from a climatic standpoint and because of the topography of the surrounding country, Karachi seems to be the logical Eastern terminus. It is reported that the decision of the Commission from the Air Ministry was to that effect and that there is little doubt that Karachi will be selected as the Indian air port.

UNITED STATES AIR FORCES

U. S. ARMY AIR SERVICE

Operating Costs

It costs, roughly, from $200 to $1500 to operate different types of airplanes for a period of six months. These figures were arrived at by the Cost Accounting Department at Luke Field which has successfully completed its first six months of work. It required much study and hard work to put the system in operation, but under the guidance of Lieut. Ray G. Harris and by the cooperation of all departments it has become efficient and accurate. The idea is not to cut down the cost of operation but to find the exact cost of maintaining aircraft at its highest degree of safety and efficiency and to determine the length of time Air Service equipment may be operated economically.

It was found that it costs for a period of six months $855.54 to operate an MB3A airplane; $1,517.27 an NBS1 (Martin Bomber); $199.29 an SE5; $536.18 a JN6 and $666.10 a DH4B. The cost per flying hour for a period of six months to operate airplanes of the Fifth Composite Group in Hawaii is as follows: 6th Squadron (682 hrs. 3 min.) $24.18; 19th Squadron (629 hrs. 28 min.) $24.37; 23rd Squadron (455 hrs. 12 min.) $28.27; 65th Squadron (81 hrs.) $21.78; 72nd Squadron (612 hr. 12 min.) $16.80. The money value of material used in operation of airplanes for second period gasoline and parts used in replacement and repairs but does of 1924 is $64,794.65. The cost as given above includes oil, not include labor.

Army Overwater Flying

A recent Army Order states that, except in case of emergency when conditions of poor visibility make such a procedure inadvisable, all Army aircraft in flying over water will remain at sufficient altitude to preclude danger or annoyance to the occupants of surface craft.

U. S. NAVAL AVIATION

Aircraft Tenders to Sail

Gratification over the part played by aircraft in the force practice of the United States fleet in the Santa Barbara Channel recently was expressed by Capt. S. E. Moses, Commander of the aircraft squadrons battle fleet.

"We sent aloft every available plane from the Langley and they carried out their assigned duties with precision and dispatch," he said. "Not a single mishap marred the part played by the airplanes and seaplanes in the maneuvers."

The aircraft carrier Langley, the flagship of Captain Moses, the tender Aroostook and the Gannet will sail from San Diego for Hawaii via San Francisco April 9, not to return to their base here again until September.

Pacific Flight

The entire squadron of new Naval PB and PN seaplanes has been ordered to fly from Hawaii to the United States mainland in June, in conjunction with the return of the battle fleet from Hawaii. Lieut. Comdrs. James Strong and Ralph Davidson have been appointed to form the squadrons. Other pilots will be picked later.

The decision to fly from the United States to Hawaii was reversed because it was considered easier to pick up the mainland than to pick up Hawaii by navigation. The entire fleet is to patrol the sea and flash searchlights at night, making a path of light for the seaplanes similar to that of the Air Mail. (The distance between San Francisco and Honolulu is 2,408 mi.)

The Navy plans regular flights if this trip proves a success. It is intended eventually to anchor an air landing depot midway between the mainland and Hawaii for refueling. The PB planes are now complete at the Boeing plant in Seattle.

Naval Pilot Ratings

All but 32 qualified Naval Aviation Pilots have been transferred to the rating of Aviation Pilot in accordance with Bureau of Navigation Circular Letter 18-24. Of this number 18 are on the Bureau's eligibility lists for chief petty officer ratings.

As it is most desirable that all men be rated in accordance with their qualifications, it has been decided to waive the requirement of holding a chief petty officer rating in the case of the 18 men mentioned and, if otherwise fully qualified, their ratings will be changed to Aviation Pilot.

When this has been accomplished, the situation at any time with regard to qualified enlisted fliers will be apparent from the number of men in service of the rating of Aviation Pilot.

Naval Anti-aircraft Fizzle

Forty-four anti-aircraft guns on the eleven dreadnaughts in twenty rounds of fire during practice on March 25 failed to hit the eight sleeve targets towed by airplanes at about 6,000 ft. altitude, according to officers of the U.S.S. Aroostook, airplane tender.

Seventy miles off shore these dreadnaughts in battle line at a speed of eighteen knots, cut loose with all the gunnery power they had. It was the first supreme test of their effectiveness against an enemy fleet, represented by towed targets simulating battleships, floating targets indicating destroyers and aerial sleeves of cloth towed by bombing airplanes, representing enemy aircraft.

The eleven dreadnaughts were assisted in the force practice by four scout cruisers which, ranged back of the battle line, sent their scouting and fighting planes in the air for gunnery control, supplementing the aircraft catapulted from the battleships. The aircraft carrier Langley was also at the battle line with its aerial squadrons.

The statement that the anti-aircraft six-minute firing of twenty rounds from forty-four guns of the battle fleet failed to register a hit on the eight aerial sleeve targets was made by Lieut. Comdr. James H. Strong of the Aircraft Squadrons of the Battle Fleet.

"They missed the targets, but nearly hit a couple of our airplanes that were towing them," he said.

Secretary Wilbur, noting reports that eleven dreadnaughts failed to score a hit in anti-aircraft target practice, called upon Admr. Robert E. Coontz, commander-in-chief of the fleet, for a report. After the facts have been officially received Secretary Wilbur will indicate his next step in a situation that has occasioned considerable concern in Naval quarters close to the Secretary.

The department, it is understood, is interested in the San Pedro report of failure of the fleet to hit airplane targets. Should official reports corroborate the statement the Navy like the Army, will be confronted with the necessity of improving its anti-aircraft weapons or bettering its gunnery.

The performance of the anti-aircraft gunners coming so quickly upon the heels of the recent public demonstration in the Hampton Roads of the inability of the Army to score more than one hit on sleeve targets towed by airplanes, furnishes further proof of the value of aircraft.

Los Angeles New Trip to Bermuda

The fact that the Naval airship Los Angeles formerly the ZR3 suffered serious injury on her trip to Bermuda last month and has not been safe to send in the air since then became known recently.

Several duralumin hull girders have to be replaced. They were damaged on the trip to Bermuda Feb. 21, when calcium chloride, used to prevent the water ballast from freezing, dripped down on the framework of the airship and corroded it.

Capt. George W. Steele, commander of the air station, said the return trip to Bermuda, postponed last month on account of the damage, would be made as soon as possible after repairs are completed.

The tender Patoka, which is equipped with a mooring mast to which the Los Angeles and Shenandoah can be moored at sea, has been carrying fuel oil from a Mexican Gulf port to Cuba. It will have completed this work in time to be sent to Bermuda to await the arrival of the Los Angeles.

Plans originally outlined for last month's trip of the airship to the island, modified on account of the bad weather, will be carried out on the next trip if weather permits. They call for a stop at Bermuda for a few hours, delivery of air mail and visits to the Governor of the island by the Commander and other officers. The airship will be moored to the mast of the Patoka in the great sound near Hamilton Harbor.

The damage the Los Angeles suffered on her last trip has proved much more extensive than at first believed. Both the Los Angeles and the Shenandoah are equipped with a water recovery system which condenses the water existing in the engine exhaust gases. The water thus recovered compensates for the weight of gasoline used, and the weight of the airship is thus retained evenly without having to valve any of the helium gas which fills the envelope.

The flight of the Los Angeles to Bermuda was made when cold weather was likely to freeze the pipes of the water recovery system and the water itself. To obviate this, calcium chloride was used as an anti-freezing mixture. It dripped in such quantities as to eat away large sections of the girders.

Since then, Navy Department officials say, experiments have found the necessary means to prevent such damage hereafter. If next month's trip to Bermuda is successful, plans for an immediate flight to Cuba and Porto Rico will be worked out. Among the places the airship may visit are Guaycayanabo or Guantanamo in Cuba, and San Juan in Porto Rico. The port of Mayaguez also is being considered as a stopping place.

Navy Diplomatic Transport

Naval seaplanes in Panama were pressed into service for speedy transportation of American diplomatic representatives in connection with the recent uprising of the San Blas Indians. The incident is reported by the Naval Air Station at Coco Solo, Panama Canal Zone, as follows.

The San Blas Indians inhabit the sea coast and islands of Panama between Port Bell and Puerto Obaldia. The Panamanian Government has for some years been exercising police, educational and quasi-political functions in this region. The Indians, however, maintain their own tribal political organization and have resented the presence of Panamanian police and school teachers.

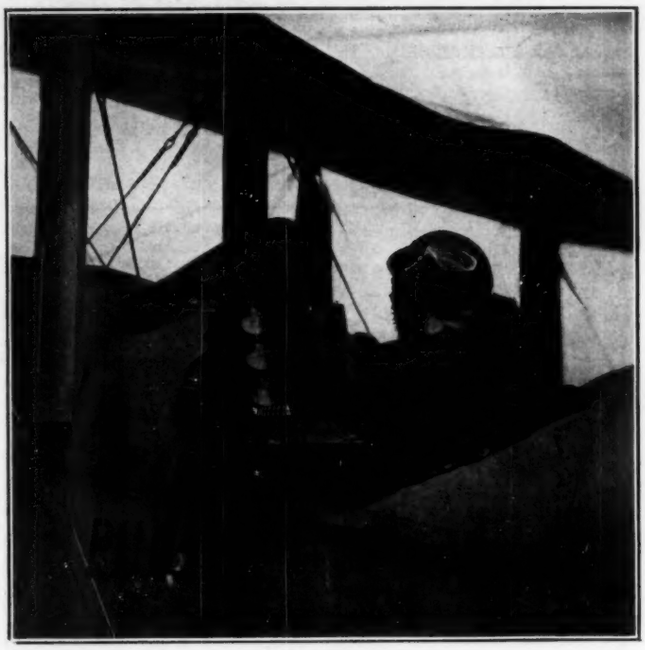
Recently during the Carnival Season, the Indians rebelled and murdered twenty-two Panamanians, mostly police. Excitement ran high. The Panamanian Army (which is also the local police) was hurriedly embarked aboard chartered yachts and tugs which took them to San Blas Gulf, the center of the disturbance. The United States Minister to Panama, with various Panamanian Government officials also went to the scene aboard the U.S.S. Cleveland.

After negotiations started, it became necessary for the U. S. Minister, the Hon. John Glover South, to return to Panama and he radioed on the morning of March 2 for a plane. One hour later, two twin-engined seaplanes, type F5L, left the station. The planes landed alongside the Cleveland, in San Blas Gulf, and Minister South and his party were transferred by boat to the planes; one hour and thirty-five minutes later Minister South was landed in Balboa, an air line distance of 120 mi. from the Cleveland. Minister South stated that he enjoyed the trip immensely. The pilot of the plane and Minister South were both very dubious at first, since the latter weighed 260 lb.

Minister South, after conferring with the Panamanian Government the same day and following morning, requested to be flown back to the San Blas region. Accordingly, two planes were despatched to Balboa where he was embarked and flown back to San Blas. The use of the planes made possible the settlement of the San Blas rebellion a week earlier than could have been done otherwise.

Naval Aviation Aids Weather Bureau

Knowledge of the hitherto unknown conditions of the air at high altitudes will be made available to the Weather Bureau in Washington through an arrangement with the Naval Air Station, Anacostia, D. C. This arrangement provides for a special daily flight of a Naval plane, carrying an aerological observer and instruments, to record the air temperature and humidity far above the surface. With this information available, advance forecasts can be made with greater certainty and for longer periods in the future than is now the case. The unknown conditions of the atmosphere at several thousand feet altitude have in the past injected an unknown quantity in weather forecasting calculations, particularly the "long range" forecasts. The temperature and humidity conditions of the "upper air" exert a very direct influence on weather conditions at the surface. As this information becomes available, through use of aircraft, an appreciable increase in the accuracy of weather forecasting may be expected.



P. & A. Photo

Lieut. L. T. Hunt, U.S.N., holding the recording barograph used by Navy in cooperating with Weather Bureau

The observations will be made by a Navy aerologist, trained in weather observation and forecast, who will carry with him in the plane recording thermometers and barographs which will record conditions with mathematical accuracy. After the plane lands, the information will be at once communicated to the Weather Bureau for use in preparing the daily forecasts, as well as being transmitted to the Army and Navy aviation stations in the vicinity of Washington.

The practical value of this aid to forecasting has been demonstrated in California. The Naval Air Station at San Diego has for the past year been making flights for this purpose and sending the information to the Weather Bureau office in San Francisco. Reports from the West Coast state that this data has been of great benefit in the preparation of forecasts.

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PUBLISHER'S NEWS LETTER

Visitors to Washington since the adjournment of Congress find the aeronautical situation in a lull which is usually the aftermath of any great activity. The demands for all kinds of information by the various committees that have been seeking light on the subject of air defense, have caused the officers of the Air Service to become tired out, both mentally and physically. Requests for any kind of news is met with the same reply in practically every quarter. "Look in the Hearings" is the stereotyped reference. And it is undoubtedly true that every bit of informative data that could be made available has been put in to the record of one or the other of the hearings. The Lampert Committee took testimony and received reports that will take five large volumes to contain. It will undoubtedly be the most complete exposition of all aeronautical information that has yet been gathered together. Then the hearings on the Curry Bill have reproduced in a single volume the various arguments that revolve about the acute question of an Indepedent Air Force. When these, and the appropriation bill testimony are printed and available they will comprise a veritable library of both governmental and civil aerial thought.

* * * *

Of course the most talked of subject is the tangible results of all the recent discussions of aircraft. It can be said with great certainty, that between now and the time that Congress convenes, in the Fall, what can be termed a Coolidge Air Policy may be expected in the form of either a clear statement or some concrete legislation for the consideration of the next session. It is inconceivable that the President will permit a matter, which has assumed such great importance in the public mind, to become the subject of controversy on "The Hill" without a definite plan from the executive. Just what this will be is being guessed about in all quarters where aircraft matters are discussed. Even before Secretary Weeks' sudden attack of thrombosis, it was the unanimous opinion that he would resign before the year was over. The same opinion holds as to Secretary Wilbur. With these members of the Cabinet in office there has been little hope for any great change, both being graduates of the Naval Academy and indoctrinated with the older naval traditions. Then, too, there has been a certain amount of personal criticism that has put the President in a position of having to take the side of members of his official family. If the changes in the Cabinet occur this factor will be removed and then the aircraft affairs of the government can be considered freed of any other influence than the plain and cold facts. The consensus of opinion seems to be that the successors to the present heads of the Army and Navy will follow the President's matured thought rather than adopt a policy of their own.

* * * *

Should Secretary Weeks decide that his health will no longer permit him to continue in office, his four years at the War Department will pass without any record having been made of outstanding aeronautical interest. Such development as there has been has come as the result of intensive work on the part of the officers of the Air Service. By this it should not be inferred that Mr. Weeks has not had a most sympathetic leaning toward aerial development. He has shown this in too many ways to make such an impression a fair one. But he has had around him the same General Staff influences that have tended to hold the Air Service in check ever since the War. It is this obstacle that is causing the country to give support to the idea of some form of a separate aviation department. The two decisions of the Secretary that AVIATION was particularly interested in, was his mandatory order to General Menoher and other officers to sell the stock they owned in the magazine *U. S. Air Service* and more recently his direct order to General Patrick to sever his connection with this magazine and not to permit officers on active duty to favor this publishing company which has been representing itself as publishing a Service magazine. He recognized the unfairness of this practise to other publications. When the time comes that his relationship to the Air Service is over, it will then be time to review his other acts.

* * * *

Another topic that is worrying nearly everybody in air circles in Washington is the Pulitzer Race. It is said on the best of authority that neither of the Air Services wanted to race this year. Not one person had anything favorable to say about the Services spending large sums for racing aircraft. All that could be learned was that the two Secretaries had become enamored of the idea and had made the decision themselves. Of course this information did not come from anyone in the Services, for when decisions come down from the top, there is no thought given to personal preferences. Quite as much anxiety is being shown about finding a place to hold the race. After the experiences of Detroit, St. Louis and Dayton with the attendant expense and great preparatory effort, there seems to be a natural reluctance on the part of other cities to undertake the obligation. Of which more will be said editorially.

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Before me, a notary public in and for the State and county aforesaid, personally appeared George Newbold, who, having been duly sworn according to law, deposes and says that he is the Business Manager of AVIATION and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of Aug. 24, 1912, embodied in section 443, Postal Laws and Regulations, to wit:

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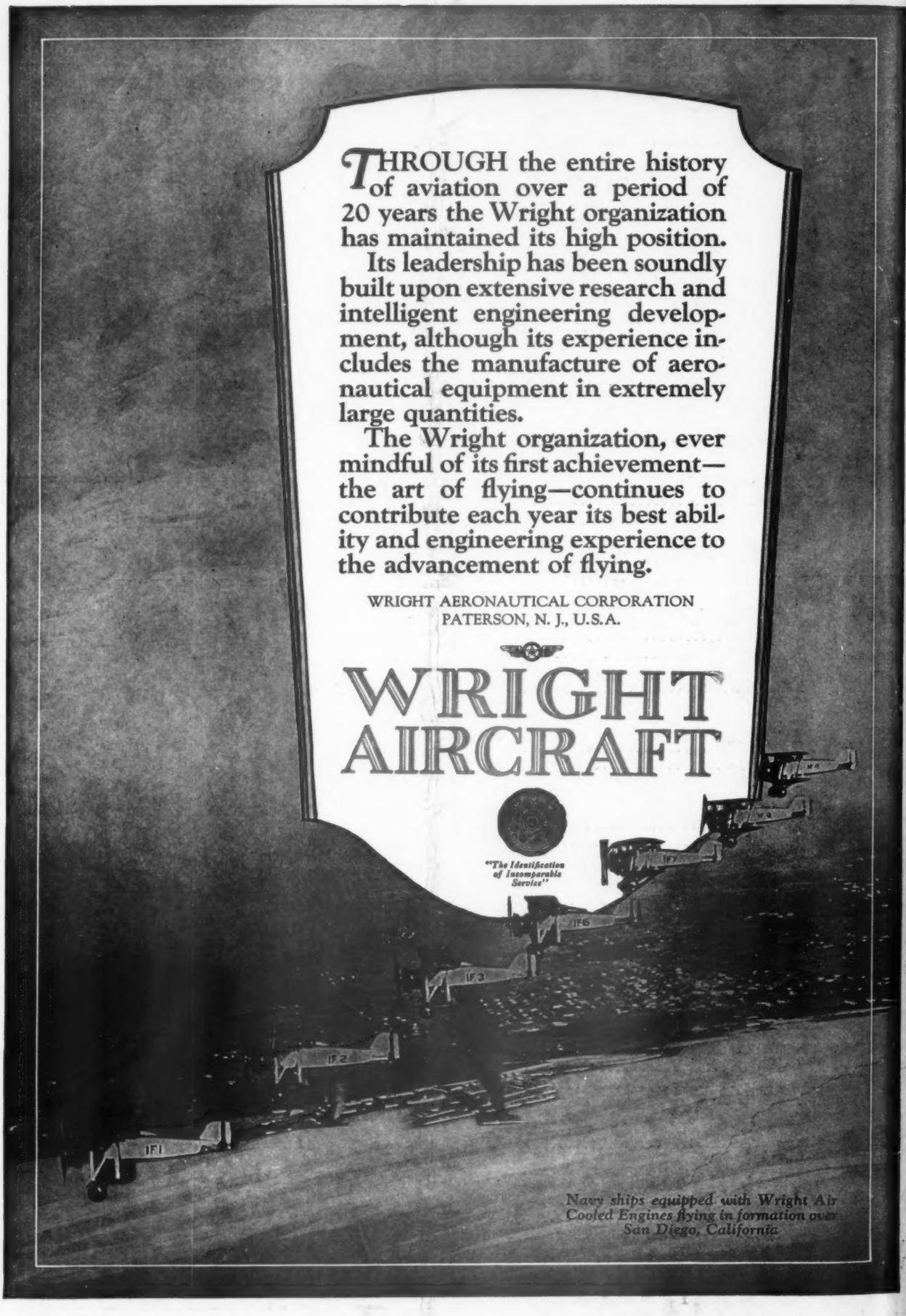

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